

## **MP1**

- Graphing
- Pile Driver
- Appliance Log
- Battery Lab

## **MP2**

- Photosynthesis
- Cellular Respiration
- Food Chain
- Owl Pellet
- Food Webs
- Biomes

## **MP3**

- Ecology Nowicki Ch. 14
- Properties of Water
- Water Cycle
- Nitrogen Cycle
- Carbon Cycle

## **MP4**

- Energy Sources Project
- Renew-a-bean
- Toil for Oil
- Gas Lands
- Green House effect

## Energy Review

Define the following types of energy:

**Kinetic Energy:**

**Thermal Energy:**

**Light Energy:**

**Electrical Energy:**

**Gravitational Potential Energy (GPE):**

**Chemical Potential Energy (CPE):**

**Sound Energy:**

1) What do we mean if we say something is 100% efficient?

2) What type of energy do you typically get any time there is an energy transfer (think about what happens to appliances when you use them too long)?

3) What is the main source of light energy on Earth?

4) What types of energy are present if you have wind blowing a windmill to turn a turbine, which is attached to a light bulb, which gets lit?

5) What types of energy are present when plants use sunlight to undergo photosynthesis to produce glucose?

6) An object is dropped from a building. As it falls \_\_\_\_\_ is transferred into \_\_\_\_\_ energy.

7) When you use an iPod, \_\_\_\_\_ from the batteries is used to generate \_\_\_\_\_ energy in order to get \_\_\_\_\_ energy from your headphones.

Define the following.

Kinetic Energy

Gravitational Potential Energy

Heat

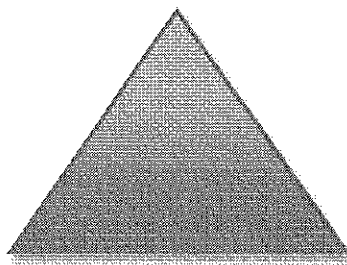
Chemical Energy

ATP

Light energy

Electrical Energy

Explain what is meant by the Trophic Pyramid. What did it have to do with the predator/prey lab?



Name\_\_\_\_\_

Per\_\_\_\_\_Date\_\_\_\_\_

**Photosynthesis** is \_\_\_\_\_

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Chemical Formulas

**Photosynthesis**

Names:

\_\_\_\_\_+\_\_\_\_\_+\_\_\_\_\_-->\_\_\_\_\_+\_\_\_\_\_

Symbols:

\_\_\_\_\_+\_\_\_\_\_+\_\_\_\_\_-->\_\_\_\_\_+\_\_\_\_\_

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**Cellular Respiration** is \_\_\_\_\_

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Chemical Formulas

**Cellular Respiration**

Names:

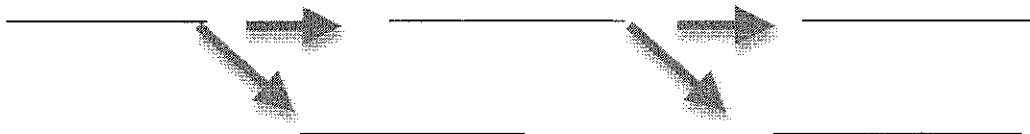
\_\_\_\_\_+\_\_\_\_\_-->\_\_\_\_\_+\_\_\_\_\_+\_\_\_\_\_

Symbols:

\_\_\_\_\_+\_\_\_\_\_-->\_\_\_\_\_+\_\_\_\_\_+\_\_\_\_\_

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Energy changes for **Photosynthesis and Cellular Respiration**



Explain how the law of conservation of energy applies to Photosynthesis.

Explain how the law of conservation of energy applies to Cellular Respiration

What is meant by the statement "Cellular Respiration is the opposite of Photosynthesis."

What is ATP?

Fill in the blanks.

The part of the plant cell that does photosynthesis is called the \_\_\_\_\_.

The part of the plant cell that does cellular respiration is called the \_\_\_\_\_.

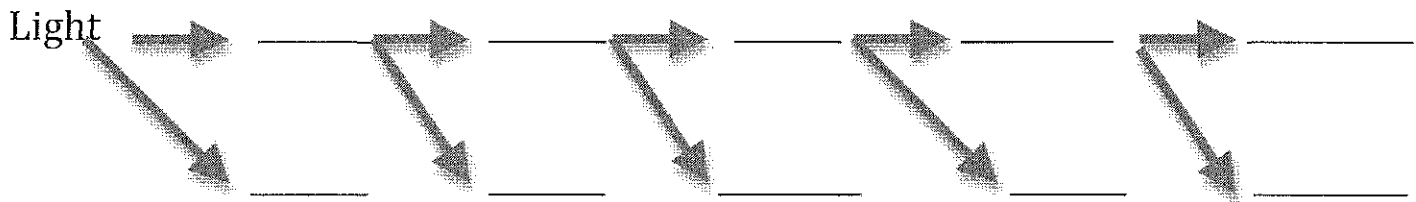
The part of the animal cell that does cellular respiration is called the \_\_\_\_\_.

How do Photosynthesis and Cellular Respiration act as a cycle? What does photosynthesis “give” to cellular respiration? What does cellular respiration “give” to photosynthesis?

What are the steps of the food chain? Give an example. How do Photosynthesis and Cellular respiration fit into the food chain?

Why are photosynthesis and cellular respiration important to your life?

Track the flow of energy from (Sun)Light all the way to you picking up and dropping a glass bottle into a recycle bin. Be sure to include all energy transfers all the way from the sun's energy until the bottle lands in the recycle bin. Think about how the sun's energy gets to you through your diet (complete with fruits and vegetables) and how you would give the energy to the bottle.



## Remediation Lab One

Name:

Date:

A student did an experiment at home where she added different amount of liquid fertilizer to plants to see the effect on plant growth. All of the plants had soil in the containers. Liquid fertilizer is used to make the plants grow faster. She gave all the plants the same amount of water and light, and let them all grow for a month. She recorded the heights after one month of growth. Below is the data that the student collected.

Amount of Fertilizer (ml)	Plant height (cm)
.5ml	3cm
1 ml	3.4 cm
1.5 ml	4.2 cm
2 ml	4.7 cm
2.5 ml	5.3 cm
3 ml	6 cm
3.5 ml	6.5 cm

1. (0.1P/HP)

What is the independent variable?  
Why?

What is the dependent variable?  
Why?

2. (0.2P/HP) Make a proper graph of the data

3. (0.3 P) Think about it, should you start your line at (0,0), please explain.

4. (0.3P) What is the slope of the line on your graph?

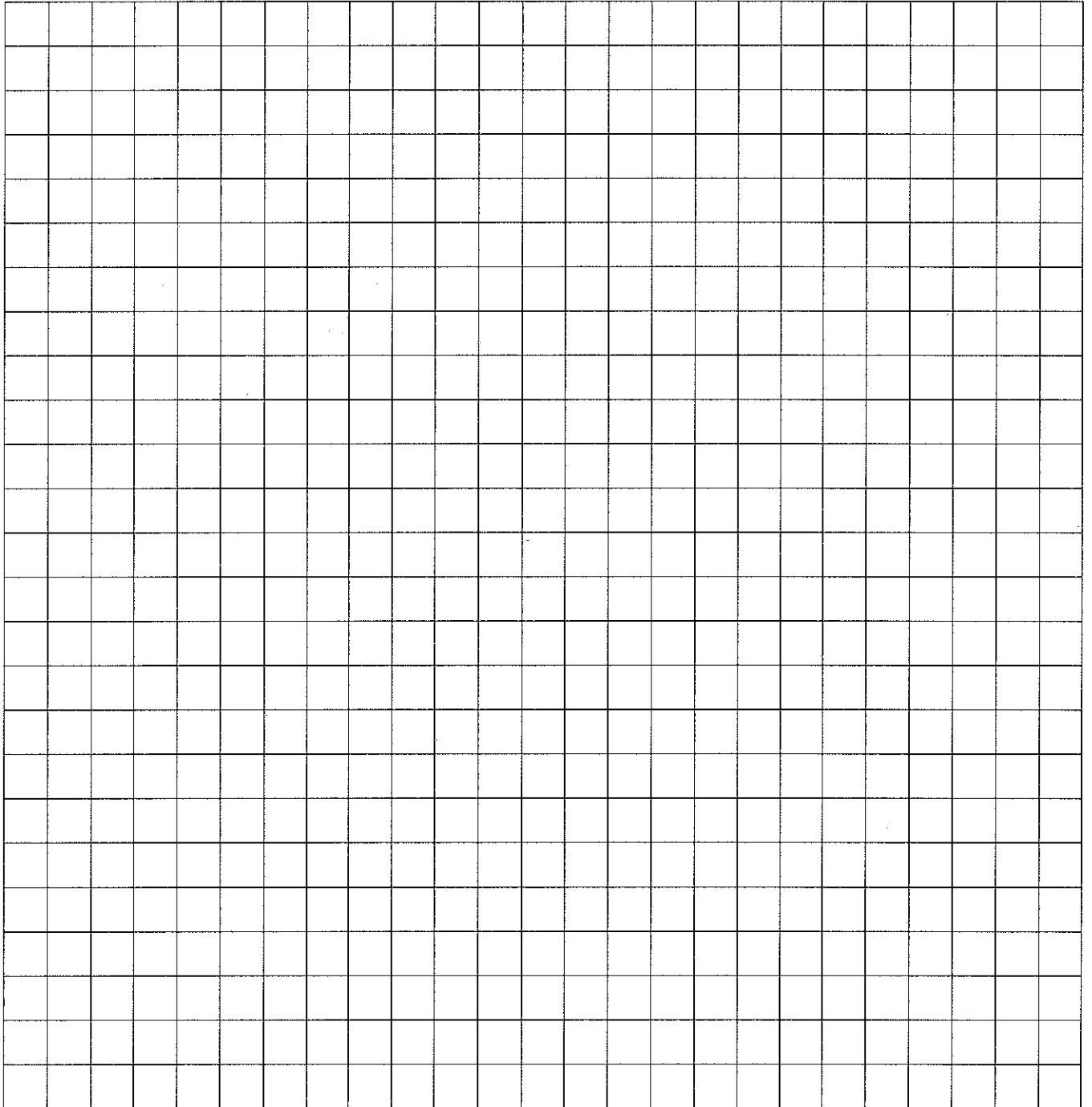
5. (0.3P) What does the slope mean according to this data?

6. (0.3HP) What would the plants height be if the student used 4.5 ml of fertilizer?

7. (0.4P/HP) What is the relationship between the amount of fertilizer and the height of the plant? Use multiple forms of data to support the relationship.
8. (1.1P) What are the energy transfers from the sun to the plant?
9. (1.1P) What if she ate the plant, what would the energy transfers be then?
10. (1.2P) What is the law of conservation of energy, and how does it apply to the energy transfers you discussed in question 8?
11. (2.1P) How does the plant get its energy from the sun? (Discuss all of the inputs and outputs).
12. (2.2P) How would the girl get energy from the plant if she ate it? (Discuss all inputs and outputs)
13. (2.3P) What are the similarities/connections between your answers for question 11 and 12?

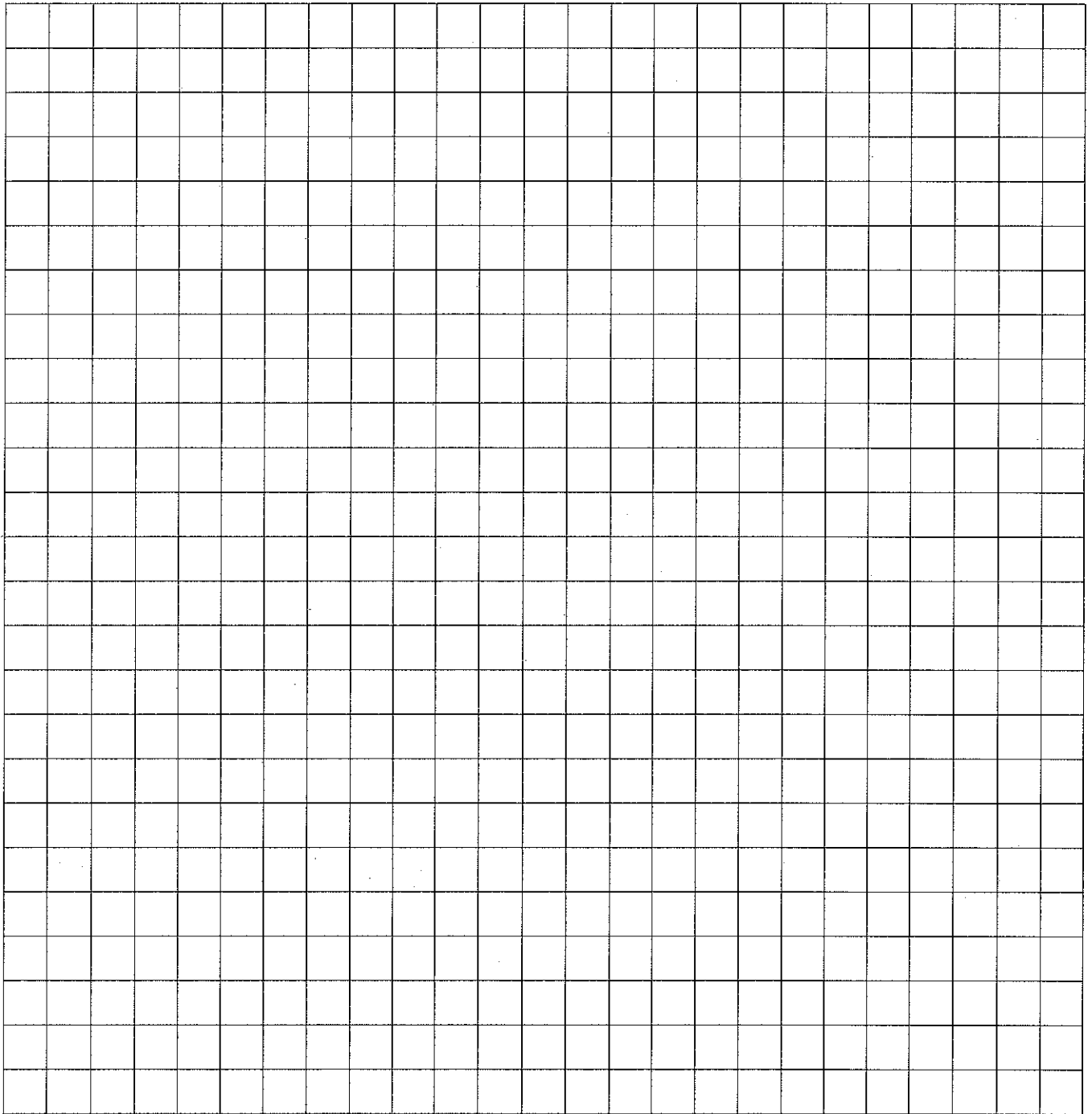
Name\_\_\_\_\_ Date\_\_\_\_\_ Period\_\_\_\_\_

Make Graph here.



Name\_\_\_\_\_ Date\_\_\_\_\_ Period\_\_\_\_\_

Make Graph here if you messed up on the first one.



## Community Interactions and Niche Quiz

Match the scenario with the correct community interaction. Words may be used more than once.

### WORD BANK

Predation	Competition	Mutualism
Parasitism	Commensalism	

1. \_\_\_\_\_ A lizard is going around eating insects.
2. \_\_\_\_\_ A bird eats the scraps left inside an alligator's mouth. This cleans the alligator's teeth.
3. \_\_\_\_\_ Two male wolves are fighting in order to become the leader of the pack.
4. \_\_\_\_\_ Bacteria live on the skin of mammals. They have no affect on the mammals.
5. \_\_\_\_\_ A squirrel and a bird are trying to get the same nuts from a tree.
6. \_\_\_\_\_ Worms are living in the muscles of a pig and slowly killing the pig.
7. \_\_\_\_\_ An owl kills and eats a shrew.
8. \_\_\_\_\_ Trees provide humans with oxygen. Humans provide trees with carbon dioxide.

Answers the following questions.

1. Two different species of frogs are competing for the same limited resources. According to the principle of **competitive exclusion**, what are the three possible outcomes of this scenario?

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2. There are two different species of birds. One lives in North America. The other lives in Australia. They eat similar foods, have similar behavior, and play similar roles in their respective habitats. Explain why these two species of birds could be considered **ecological equivalents**.

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3. Chose one of the three types of symbiosis. Identify the type that you pick. Give an example of this type. Explain why this example fits into this type.

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## Food Chain and Food Web Practice

1. In an ecosystem there is grass, squirrels, owls, and wolves. Assume that squirrels eat the grass, owls eat the squirrels, and wolves eat the owls.

a) Design a food chain for the above scenario.

\_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

b) For each trophic level, identify the organism in this food chain

Producer:

Primary Consumer:

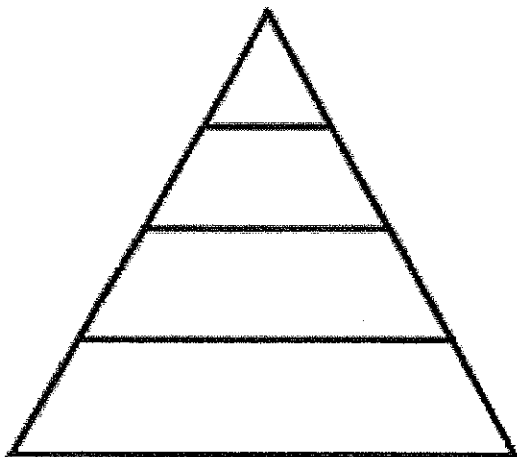
Secondary Consumer:

Tertiary Consumer:

c) There are mushrooms as part of this food chain that turned any dead organism into nutrients to put back into the soil. What trophic level would we consider the mushrooms to be?

\_\_\_\_\_

d) Fill in the energy pyramid for the food chain in this scenario.



2. The following organisms are part of an ecosystem: mushrooms, bacteria, grass, shrubs, mice, squirrels, rabbits, snakes, hawks, owls, wolves, and foxes.

Mushrooms and bacteria break down dead organisms in order to put nutrients back into the soil.

Mice eat grass.

Squirrels and rabbits eat grass and shrubs.

Snakes eat mice and squirrels.

Owls eat mice and squirrels.

Hawks eat snakes, mice, squirrels, and rabbits.

Foxes eat rabbits, squirrels, and mice.

Wolves eat rabbits, squirrels, and owls.

a) Design a food web for the above scenario

b) For each trophic level, identify the organism in this food chain

Producer:

Primary Consumer:

Secondary Consumer:

Tertiary Consumer:

Decomposers:

## Jeopardy Questions

1. What are all of the biotic and abiotic factors in an area where an organism lives?
2. What is the food, abiotic conditions, behavior, and the role an organism plays within an ecosystem?
3. They can share, one can die, and one can find other resources are the three outcomes for what principle?
4. Two frogs that have the same niche but live in different locations is an example of what?
5. When a weaker bird finds the same resources in a less desirable location, this is an example of what?
6. An example of this is when a bee gets food from a flower while the bee pollinates the flower.
7. An example of this is when mites live in the eyelashes of humans, but do not affect the humans.
8. An example of this is when a lion kills a zebra and eats it.
9. An example of this is when a group of elephants and a group of hippos are fighting for the same water supply.
10. An example of this is a tape worm living inside a cow's stomach, making the cow sick over time.
11. What is the population-density of a group of 600 turtles living in an area of 300 square miles?
12. What does a population density of 4 deer/square acre mean?
13. What is the type of population dispersion when the population is in a neat organized pattern?
14. What is the type of population dispersion when there is a school of fish grouped together in one area?
15. Name an organism that follows a type 1 survivorship curve with a low infant mortality rate and a small rate of death until old age.
16. What are the four factors that affect a population's size?
17. What type of population growth is caused by an abundance of resources?
18. What type of growth is affected by the carrying capacity of the environment?
19. What is a dramatic decline in a population over a short period of time?
20. Name some limiting factors.
21. What is the first organism to live in an area that used to be uninhabited?
22. What is the type of succession that occurs in a previously uninhabited area?
23. Name an organism that could be found in the first step of primary succession.
24. Name an event that can start primary succession.
25. Name an event that can start secondary succession.

## Water Cycle

Explain the following parts of the water cycle:

**Evaporation**

**Condensation**

**Precipitation**

**Collection**

Draw a picture showing all these steps in the water cycle:

- 1) What is another name for the water cycle?
- 2) What happens when clouds collect too much water?
- 3) What is needed to form clouds besides water vapor?
- 4) What are some different types of precipitation?
- 5) What are some different things that will collect water after it falls from the sky?
- 6) What are some ways the water cycle is important to life on Earth? Explain.

## Nitrogen Cycle

- 1) Why is nitrogen gas in the atmosphere not usable for plants and animals?
- 2) What are the three ways nitrogen can be fixed to change it from nitrogen gas into usable nitrogen compounds?
- 3) Why is nitrogen important to life?
- 4) What type of organism is responsible for most of the nitrogen fixation?
- 5) How does nitrogen get back into the air after plants and animals use it?

6) Draw the nitrogen cycle

7) Starting with nitrogen gas with the air, explain how nitrogen would go through the nitrogen cycle and end up back in the air. (There is more than one possible path for this)

## Carbon Cycle

- 1) Why is carbon considered the building block of life?
- 2) Explain the rôle that photosynthesis and respiration play in the carbon cycle.  
Draw a diagram.
- 3) What are areas that store carbon over long periods of time? Give two examples.
- 4) What is the carbon compound that occurs naturally in the air?

- 5) What organisms play an important role in the breakdown of dead carbon-based material and the creation of fossil fuels?
- 6) Why does burning fossil fuels put extra carbon compounds into the environment?
- 7) What are the three main types of fossil fuels? What do we use fossil fuels for?
- 8) What are two ways we can help to limit the amount of extra carbon that gets put into the environment? Explain.
- 9) Starting with carbon in the atmosphere, trace the path of a carbon molecule through the carbon cycle. (There is more than one possible path)

### MID-UNIT 3 TEST\*

Name \_\_\_\_\_

PECO is the company that supplies our houses with electricity. Typically, they are using coal to generate electricity to power our homes.

- 1) Explain the process that PECO uses to generate electricity from coal.

First, coal is \_\_\_\_\_ to release heat.

Next, the heat is used to turn water into \_\_\_\_\_.

Finally, the \_\_\_\_\_ will be used to turn a \_\_\_\_\_ which generates electricity.

- 2) Is this process 100% efficient in making electricity? Circle the correct answer.

- a) Yes, it is 100% efficient. All of the energy is used to generate electricity.
- b) Yes, it is 100% efficient. All of the energy is used to generate heat.
- c) No, it is not 100% efficient. Some of the energy is wasted as heat instead of being used to generate electricity.
- d) No, it is not 100% efficient. All of the energy is wasted as heat.

- 3) Below is a list of energy sources. Circle the three **non-renewable** resources that PECO could use instead of coal.

Hydroelectric

Natural Gas

Solar

Biomass

Nuclear

Wind

Geothermal

Oil

7) In the future, is coal is not going to be a good source for providing electricity.  
Name two reasons why.

1) \_\_\_\_\_

2) \_\_\_\_\_

8) Instead of using coal and other non-renewable energy sources we can use  
renewable energy source. Provide three examples.

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

9) Pick one of these renewable sources and explain how it is used to generate  
electricity.

10) Using the energy source you picked in question <sup>9</sup>~~8~~, give two pros and two cons  
for using this energy source.